

Tino Rangatiratanga & Volcanic Risk Management in Aotearoa New Zealand

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Māori, the Indigenous Peoples of Aotearoa (New Zealand) are guaranteed the continued right to exercise tino rangatiratanga (self-determination) over their taonga (treasures), including their ancestral mountains and people through Te Tiriti o Waitangi (Aotearoa New Zealand's founding document). Yet, it is not clear whether Disaster Risk Reduction (DRR) levers such as law and governance enable Māori to self-determine how volcanic risk is managed. Through geospatial analysis of land tenure, review of legislation, planning provisions and governance arrangements regional complexities across four case study areas are revealed and a critical gap is identified. Māori have invested interests, and own, large proportions of land surrounding Taranaki, Ōkataina, Ngauruhoe, Tongariro, Ruapehu and Taupō volcanoes. However, provisions around owning this land and wider DRR legal frameworks do not support Māori landowners or tribal authorities in participating in volcanic risk governance or considering volcanic risk management (VRM). Despite this, some tribal authorities are exercising tino rangatiratanga and leading strategic VRM driven by several factors, including recent eruption experience. Ultimately this research argues better DRR mechanisms are required to enable tino rangatiratanga of VRM in Aotearoa and to reduce the risk and potential impacts of Māori being continually marginalised from volcanic risk decisions concerning their ancestral mountains, people and taonga, before, during and following future eruptions.

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RENACER DERECHOS, LO QUE SIGNIFICA VIVIR EN UN TERRITORIO DE ALTO RIESGO: El caso del cantón Panabaj (Santiago Atitlán, Guatemala)

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La vida en una zona de alto riesgo, como es el caso del cantón de Panabaj (Sololá, Guatemala), se complementa con los elementos naturales. Vivir bajo los volcanes es conectarte con lo sagrado, es considerar que la naturaleza recorre tu sangre; vivir entre los volcanes es vivir entre las piedras, las raíces de una comunidad: es su conexión con la tierra. Los volcanes proveen y quitan. Esto es en si mismo una oportunidad de redignificar, volver y recuperar los momentos que sueñas, La etiqueta de alto riesgo infunde temor en la comunidad, miedo, preocupación limitación a explotar las capacidades personales y sociales, no dar oportunidad a aquellos que no encuentran el camino para poder defender sus derechos. Si bien es cierto que los deslizamientos en los volcanes expone los derechos de los pueblos, no arranca sus raíces en el territorio; los derechos de mujeres, padres, hijos e hijas no esta contemplados dentro de un sistema que su fin supremo es la realización del bien común. Para las comunidad significa volver a empezar, vivir con los tuyos, es sentirte tu mismo y convivir con tus raíces aferrarte a una vida que es propia. Las capacidades locales son las semillas que germinan entre las piedras. Nos hablan sobre cómo adoptar, apropiar e interpretar los momentos naturales o causales. Las mismas comunidades crean sus propias políticas para resistir y co-crear esperanzas que se vuelven raíces para la futura generación, respetando las creencias propias e interpretación de lo que significa vivir entre volcanes.

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Personal reflections on interactions with indigenous knowledge holders during an eruption episode of Mauna Loa, Hawaii, 2022

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At the end of November 2022, social networking sites in New Zealand were flooded with photos and pictures of the eruption of the fiery red lava flows of Mauna Loa, and in some of these photos were also the distinctly snow-capped peaks of Mauna Kea. I vaguely recalled a story of these two Mauna. I added these photos to my presentation about my impending Ph.D. work relating to the indigenous understanding of volcanism and its connectivity across the Pacific. Minutes later, I received a message, 'You coming? Maunaloa is erupting'. It was a dear friend of our family, and she knew of my love for studying traditional knowledge of volcanoes. Over the years, she always brought over books, memorabilia, and gifts about the traditional knowledge of these volcanoes, accompanied by stories. Through a series of coincidental conversations and some concerted effort from a supporting supervisory team, I found my husband and I travelling to Hawaii. The purpose was to understand first-hand what the indigenous communities were going through during the eruption. This presentation recounts the journey of connections, networking, and rich storytelling with Hawaiians and visitors to the land. We will share our insights and lessons through indigenous storytelling methods, particularly engaging meaningfully and appropriately with indigenous communities and their volcanic landscape during future eruptive events.

Ko wai koe i te pūtaiao? (How do I remain indigenous/tūturu Māori (authentic) when working in science?)

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One motivation along my volcanology PhD journey was to connect to whenua (land) my tūpuna (ancestors) belong to from another perspective, and to learn skills that may be of use to my various hapū (subtribe) in the colonised reality we live in. Science is one knowledge system and way of knowing, yet Māori see the world through another knowledge system and way of knowing, known as mātauranga Māori. As a person of Te Arawa and Tainui descent, and on a lifelong path to obtain a deeper understanding of Māoritanga (Māori way of being), our ways of knowing are important to me. However, conventional science writing follows a framework: Abstract, Introduction, Methodology, Results, Discussion, Conclusions. Thus, in my PhD I found it difficult to reconcile how or where I could honour those tūpuna who came before me. It was conflicting for me deciding what to share (or not to share) with a non-Māori scientific audience, as these are not my stories, but those of the collective, i.e., all those who descend from Ngāti Tūwharetoa, the original established inhabitants who hold ahi kā (burning fires of occupation), and their subtribes who hold mana whenua (authority). My intention was to demonstrate there are stories of the land, methods of understanding and cultural nuances that existed prior to the geological perspective. After speaking to those who hold more authority and wisdom than myself e.g., tuākana (older relatives above me) and kaumātua (elders) a standalone chapter dedicated to acknowledging their history and status was incorporated.

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The science in the stories: reconstituting the geology of Hawaiian volcanoes from oral tradition

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Hawaiian volcanoes are amongst the most studied and monitored volcanic systems on earth. Written documentation of eruptive activity at Kīlauea and Mauna Loa, however, only dates back ~200 years, starting with Ellis (1825) and his visit to the Island of Hawai'i in 1823. Hawaiians did not transmit their knowledge or history through writing. Instead, many of the impactful natural events of the past were told through oral tradition/storytelling (mo'olelo), chants (mele) and dances (hula). These stories were passed along faithfully from generation to generation, and are often a mixture of real events and landscapes personified in humans, deities and animals. Translations of these stories, imperfect as they are, are a treasure trove full of potential links between metaphorical and real geological events.

No stories are more informative and riveting to the Hawai'i volcanologist than that of Pele and her relatives. Her stories have intimate ties with the formation of the Hawaiian Islands, rejuvenation volcanism on older volcanoes, and frequent activity at Kīlauea and Mauna Loa. Mo'olelo surrounding Pele and her beloved – at times rival – sister Hi'iaka led to the geological reconstruction of the last ~500 years of effusive and explosive activity at Kīlauea, including the formation of the modern caldera and the 300-yr long period of dominantly explosive activity that followed (Swanson 2008; Swanson et al. 2012). This presentation focuses on the invaluable information encapsulated in Hawaiian storytelling tradition, and how past and new translations could be key to piecing together missing chapters of our geological history.

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Matatuhi: Unlocking the forecasting potential of environmental tohu via ensemble systems models

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The educational program “Canary Islands: A volcanic window in the Atlantic Ocean” began in 2008, born from our world is changing faster and in ever more diverse ways – global records are being broken from droughts to floods. In Aotearoa we have seen cataclysmic flooding, catastrophic volcanic eruptions, and the Canterbury earthquakes. An essential task in managing and adapting to our future is being able to forecast it. Science is trying to keep up, but current forecasting models require large amounts of information, and tend to focus only on one small part of a system. Forecasts lack both sufficient data and knowledge to build reliable models. We, as scientists, are stuck. We believe that the way out is by taking a holistic methodology. Such an approach is intrinsic to Mātauranga Māori which, moreover, provides for an alternative lens on what can be considered data, beyond instrumental readings. We know that adding more voices with alternate understandings leads to better, more transparent forecasts with accurate descriptions of uncertainty.

Our project aims to provide robust forecasts of the future by combining adaptable statistical tools with the intrinsic Mātauranga of iwi, starting with Ruapehu and the Central Volcanic Plateau, and co-developed with iwi that whakapapa to this region. This research will build robust forecasts of our environmental future, and shift the conversation in Aotearoa away from “How can Mātauranga Māori be fitted into science?” and towards “What can science do to support Mātauranga Māori?”

We present the project, alongside identified risks and challenges, and invite discussion around similar successful (or otherwise) approaches from the global volcanological community.